

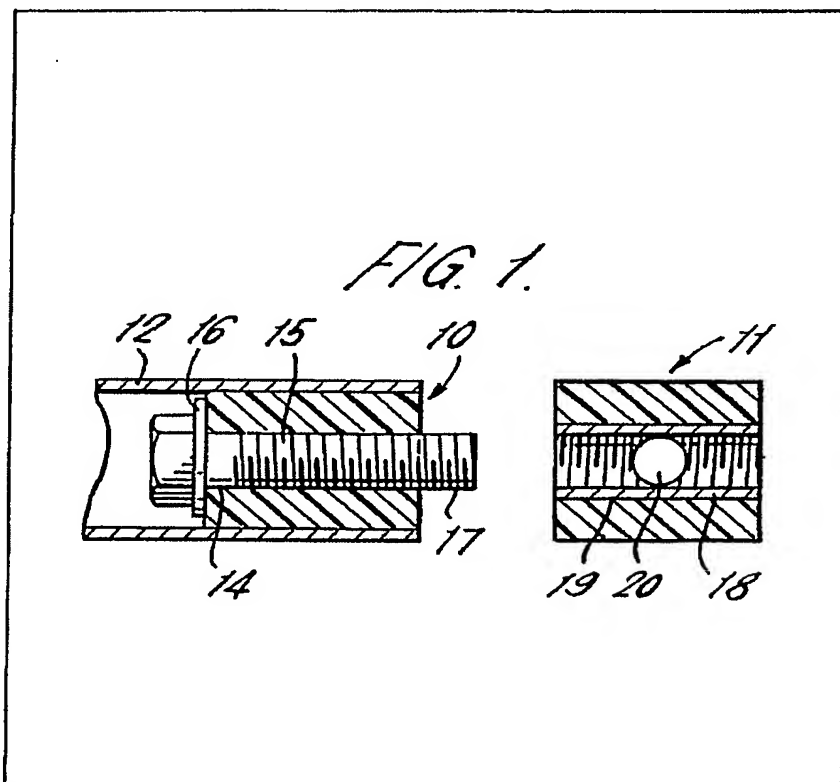
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(54) A joint assembly

(57) A joint assembly for a length of pultruded grp tube (12) has a plug of grp (10) enclosed by adhesive at one end of the tube. A threaded bolt (15) is fixed by adhesive in a hole (14) through the plug (10), there being a washer (16) trapped by the head of

the bolt and a portion (17) of the bolt extending proud of the end of the length of tube (12). A grp bobbin (11) having a threaded bush (18) fixed within a hole (19) in the bobbin is connectable to the end of the length of tube (12) by threaded engagement of the end (17) of the bolt (15) with the bush (18).



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FIG. 1.

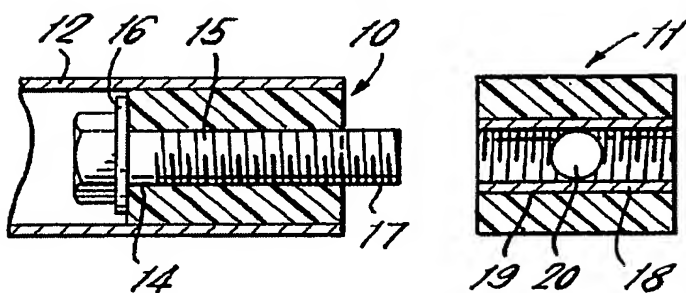


FIG. 2.

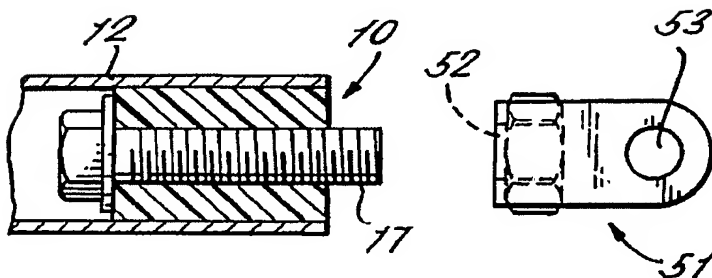
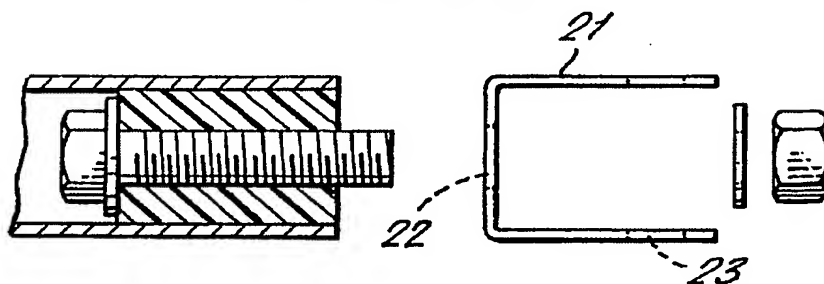


FIG. 2a.



SPECIFICATION

A joint assembly

This invention relates to a joint assembly and in particular to a joint assembly comprising a length of pultruded glass reinforced plastics tube. Glass reinforced plastics is hereinafter referred to as "grp".

A known type of joint which is used in structures of pultruded grp tube is a crimp-bonded joint. The crimp-bonded joint is commonly stronger than the grp tube itself, and is complicated and expensive to fabricate commercially. In practice, framed structures of pultruded grp tube are such that the majority of joints would be expected to carry loads far less than the failing strength of the tube itself.

According to the present invention there is provided a joint assembly comprising a length of pultruded grp tube, and coupling means comprising a plug of grp which fits at least partly within an end portion of the tube and is attached thereto by an adhesive.

The coupling means preferably comprises screw-threaded connector means on the plug, and the screw-threaded connector means preferably comprises a bolt secured in a hole in the plug and having an end portion projecting therefrom.

The bolt is secured in the plug preferably by an adhesive.

The coupling means preferably further comprises a block of grp, the block comprising screw-threaded connector means engageable with the screw-threaded means of the plug. The screw-threaded connector means of the block preferably comprises a screw-threaded bush secured in a hole in the block. The bush is secured in the block preferably by an adhesive. The coupling means preferably further comprises a bracket, the bracket being attachable at one end thereof to the end of the tube and being bifurcated at the other end thereof. The bracket may have screw-threaded connector means at the one end thereof engageable with the screw-threaded connector means of the plug. The tube may be of circular or square cross-section, and it will be appreciated that the tube may be of some other cross-section, such as hexagonal.

The invention also provides a framework or structure of pultruded grp tube comprising such a joint assembly.

By way of example, one embodiment of the joint assembly, with modifications thereto, according to the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 shows one embodiment of a joint assembly according to the invention,

Figure 2 shows a modified form of the joint assembly; and

Figure 2a shows a further modified form of the joint assembly.

A joint assembly, as shown in Figure 1, comprises a plug 10 which is secured in the end of a length of pultruded glass reinforced plastics (grp)

65 tube 12. The tube 12 is preferably of circular or square cross-section. The plug 10 is also of grp material and is shaped to fit in the bore of the tube 12. The plug 10 is secured to the tube 12 by an adhesive. It will be noted that this adhesive has to bond together two parts which are of like material, namely grp, and an adhesive suitable for this purpose is "Flexon 241".

The plug 10 has a threaded bolt 15 secured in a hole 14 in the plug. A washer 16 is trapped between the plug 10 and the head of the bolt 15. An adhesive, such as "araldite", applied around the shank of the bolt 15, is used to prevent it from rotating relative to the plug 10. A threaded end portion 17 of the bolt 15 extends beyond the plug 10, and in the finished joint assembly, beyond the end of the tube 12.

In order to be able to join two lengths of tube 12 together, the joint assembly further comprises a block 11. The block 11 is also of grp material and may, for neatness have the same outer profile as the tube 12. The block 11 has a threaded bush 18 secured in a hole 19 in the block. An adhesive, such as "araldite", applied around the outside of the bush 18, is used to prevent it from rotating relative to the block 11. The bush 18 and the end portion of the bolt 15 are threadably engageable with one another.

A modified form of joint assembly, which is shown in Figure 2, comprises a bifurcated bracket 51. At the non-bifurcated end of the bracket 51 there is a tapped hole 52 which is threadably engageable on the end portion 17 of the bolt 15. The bracket 51 has a hole 53 at the bifurcated end thereof, and the bracket can be connected to another element in known manner. The other element may be a block 11 as shown in Figure 1, with a suitable hole 20 therethrough, or part of the tube 12 itself, again with a suitable hole therethrough, or the element may, for example, be a fixed anchoring point.

A further modified form of joint assembly, as shown in Figure 2a, comprises a sheet metal bracket 21. The bracket 21 has a plain hole 22 at one end so that it can be mounted on the end of the tube 12 and fastened there by a standard nut and washer. Hole 23 allows the bracket 21 to be connected to another element in known manner.

It will be seen now, using the joint assemblies described above, a framed structure can be built from pultruded grp tube.

An advantage of a joint assembly according to the present invention lies in the simple and inexpensive way in which framed structures comprising pultruded grp tube can be built using these joint assemblies.

CLAIMS

1. A joint assembly comprising a length of pultruded grp tube, and coupling means comprising a plug of grp which fits at least partly within an end portion of the tube and is attached thereto by an adhesive.

2. A joint assembly as claimed in claim 1 wherein the coupling means comprises screw-

threaded connector means on the plug.

3. A joint assembly as claimed in claim 2 wherein the screw-threaded connector means comprises a bolt secured in a hole in the plug and having an end portion projecting therefrom.

4. A joint assembly as claimed in claim 3 wherein the bolt is secured in the plug by an adhesive.

5. A joint assembly as claimed in claim 2, claim 3 or claim 4 wherein the coupling means further comprises a block of grp, the block comprising screw-threaded connector means engageable with the screw-threaded connector means of the plug.

6. A joint assembly as claimed in claim 5 wherein the screw-threaded connector means of the block comprises a screw-threaded bush secured in a hole in the block.

7. A joint assembly as claimed in claim 6 wherein the bush is secured in the block by an adhesive.

8. A joint assembly as claimed in any one of

claims 2 to 7 wherein the coupling means further comprises a bracket, the bracket being attachable at one end thereof to the end of the tube and being bifurcated at the other end thereof.

9. A joint assembly as claimed in claim 8 wherein the coupling means is attachable to the end of the tube by having screw-threaded connector means at one end thereof engageable with the screw-threaded connector means of the plug.

10. A joint assembly as claimed in any preceding claim wherein the tube is of circular cross-section.

11. A joint assembly as claimed in any one of claims 1 to 9 wherein the tube is of square cross-section.

12. A joint assembly substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

13. A framework or structure of pultruded grp tube comprising a joint assembly as claimed in any preceding claim.